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10073666-053403

Range Facility at Barking Sands in Kauai, Hawaii. This facility uses an array of fixed survey buoys anchored at pre-determined offshore locations. A graphic of an island (topographic map) is then "overlaid" onto the buoys' global coordinates on a map or display, and naval weapon systems are directed to fire at particular locations on the virtual island. Sensors on the buoys record the impacts of rounds on the water. The sensor data for each buoy includes a time-stamp and location of the respective buoy, and is communicated back to a central processing station where the data is used to compute the trajectory of a round and the impact point of the round. From this information, a virtual impact point with respect to the previously implemented, flat virtual target range is calculated and overlain onto the target range. Another example is the Potomac River Test Range of the United States Naval Surface Weapon Center Dahlgren Division. This facility superimposes a flat image of the north end of San Clemente Island over an impact area defined on the Potomac River using an IMPASS buoy system whereby each buoy is free-floating and equipped with a hydro-phonic sensor and global positioning system.

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B

The target system can be used for simulated fire while a ship is in a harbor or dockside, or for simulated or live fire during a voyage or in a designated target area. The target system thus allows for anytime-anywhere training and minimizes or eliminates travel to and from a training facility. To maximize training efficiency, the target system can use available terrain databases to implement life-like, virtual, three-dimensional graphical views of geographic formations, such as virtual islands or virtual coastline, and can use available databases of physical objects to implement three-dimensional views of targets to be overlain on the geographic formations. By enabling three-dimensional graphical views of virtual target ranges, the target system can more accurately calculate results of a fire exercise and can be used to effectively train spotters as well as other naval personnel in a near realistic environment.